

60020830-0003.ST25
SEQUENCE LISTING

<110> Wun, Tze-Chein
Wun, Tze-Chein

<120> Novel Recombinant Anticoagulant Proteins

<130> 60020830-0003

<160> 41

<170> PatentIn version 3.1

<210> 1
<211> 382
<212> PRT
<213> Artificial

<220>
<223> Fusion protein: human-derived ANV with TAP

<400> 1

Ala Tyr Asn Arg Leu Cys Ile Lys Pro Arg Asp Trp Ile Asp Glu Cys
1 5 10 15

Asp Ser Asn Glu Gly Gly Glu Arg Ala Tyr Phe Arg Asn Gly Lys Gly
20 25 30

Gly Cys Asp Ser Phe Trp Ile Cys Pro Glu Asp His Thr Gly Ala Asp
35 40 45

Tyr Tyr Ser Ser Tyr Asn Asp Cys Phe Asn Ala Cys Ile Gly Ser Ala
50 55 60

Gln Val Leu Arg Gly Thr Val Thr Asp Phe Pro Gly Phe Asp Glu Arg
65 70 75 80

Ala Asp Ala Glu Thr Leu Arg Lys Ala Met Lys Gly Leu Gly Thr Asp
85 90 95

Glu Glu Ser Ile Leu Thr Leu Leu Thr Ser Arg Ser Asn Ala Gln Arg
100 105 110

Gln Glu Ile Ser Ala Ala Phe Lys Thr Leu Phe Gly Arg Asp Leu Leu
115 120 125

Asp Asp Leu Lys Ser Glu Leu Thr Gly Lys Phe Glu Lys Leu Ile Val
130 135 140

Ala Leu Met Lys Pro Ser Arg Leu Tyr Asp Ala Tyr Glu Leu Lys His
145 150 155 160

60020830-0003.ST25

Ala Leu Lys Gly Ala Gly Thr Asn Glu Lys Val Leu Thr Glu Ile Ile
165 170 175

Ala Ser Arg Thr Pro Glu Glu Leu Arg Ala Ile Lys Gln Val Tyr Glu
180 185 190

Glu Glu Tyr Gly Ser Ser Leu Glu Asp Asp Val Val Gly Asp Thr Ser
195 200 205

Gly Tyr Tyr Gln Arg Met Leu Val Val Leu Leu Gln Ala Asn Arg Asp
210 215 220

Pro Asp Ala Gly Ile Asp Glu Ala Gln Val Glu Gln Asp Ala Gln Ala
225 230 235 240

Leu Phe Gln Ala Gly Glu Leu Lys Trp Gly Thr Asp Glu Glu Lys Phe
245 250 255

Ile Thr Ile Phe Gly Thr Arg Ser Val Ser His Leu Arg Lys Val Phe
260 265 270

Asp Lys Tyr Met Thr Ile Ser Gly Phe Gln Ile Glu Glu Thr Ile Asp
275 280 285

Arg Glu Thr Ser Gly Asn Leu Glu Gln Leu Leu Leu Ala Val Val Lys
290 295 300

Ser Ile Arg Ser Ile Pro Ala Tyr Leu Ala Glu Thr Leu Tyr Tyr Ala
305 310 315 320

Met Lys Gly Ala Gly Thr Asp Asp His Thr Leu Ile Arg Val Met Val
325 330 335

Ser Arg Ser Glu Ile Asp Leu Phe Asn Ile Arg Lys Glu Phe Arg Lys
340 345 350

Asn Phe Ala Thr Ser Leu Tyr Ser Met Ile Lys Gly Asp Thr Ser Gly
355 360 365

Asp Tyr Lys Lys Ala Leu Leu Leu Leu Ala Gly Glu Asp Asp
370 375 380

<210> 2
<211> 378
<212> PRT
<213> Artificial

<220>
<223> Fusion protein: human-derived ANV with artificial 6L15 (a variant
Page 2

60020830-0003.ST25
of naturally occurring bovine pancreatic trypsin inhibitor)

<400> 2

```

Ala Gln Val Leu Arg Gly Thr Val Thr Asp Phe Pro Gly Phe Asp Glu
 1           5           10           15
Arg Ala Asp Ala Glu Thr Leu Arg Lys Ala Met Lys Gly Leu Gly Thr
 20           25           30
Asp Glu Glu Ser Ile Leu Thr Leu Leu Thr Ser Arg Ser Asn Ala Gln
 35           40           45
Arg Gln Glu Ile Ser Ala Ala Phe Lys Thr Leu Phe Gly Arg Asp Leu
 50           55           60
Leu Asp Asp Leu Lys Ser Glu Leu Thr Gly Lys Phe Glu Lys Leu Ile
 65           70           75           80
Val Ala Leu Met Lys Pro Ser Arg Leu Tyr Asp Ala Tyr Glu Leu Lys
 85           90           95
His Ala Leu Lys Gly Ala Gly Thr Asn Glu Lys Val Leu Thr Glu Ile
 100          105          110
Ile Ala Ser Arg Thr Pro Glu Glu Leu Arg Ala Ile Lys Gln Val Tyr
 115          120          125
Glu Glu Glu Tyr Gly Ser Ser Leu Glu Asp Asp Val Val Gly Asp Thr
 130          135          140
Ser Gly Tyr Tyr Gln Arg Met Leu Val Val Leu Leu Gln Ala Asn Arg
 145          150          155          160
Asp Pro Asp Ala Gly Ile Asp Glu Ala Gln Val Glu Gln Asp Ala Gln
 165          170          175
Ala Leu Phe Gln Ala Gly Glu Leu Lys Trp Gly Thr Asp Glu Glu Lys
 180          185          190
Phe Ile Thr Ile Phe Gly Thr Arg Ser Val Ser His Leu Arg Lys Val
 195          200          205
Phe Asp Lys Tyr Met Thr Ile Ser Gly Phe Gln Ile Glu Glu Thr Ile
 210          215          220
Asp Arg Glu Thr Ser Gly Asn Leu Glu Gln Leu Leu Leu Ala Val Val
 225          230          235          240

```

60020830-0003.ST25

Lys Ser Ile Arg Ser Ile Pro Ala Tyr Leu Ala Glu Thr Leu Tyr Tyr
 245 250 255

Ala Met Lys Gly Ala Gly Thr Asp Asp His Thr Leu Ile Arg Val Met
 260 265 270

Val Ser Arg Ser Glu Ile Asp Leu Phe Asn Ile Arg Lys Glu Phe Arg
 275 280 285

Lys Asn Phe Ala Thr Ser Leu Tyr Ser Met Ile Lys Gly Asp Thr Ser
 290 295 300

Gly Asp Tyr Lys Lys Ala Leu Leu Leu Leu Ala Gly Glu Asp Asp Met
 305 310 315 320

His Pro Asp Phe Cys Leu Glu Pro Pro Tyr Asp Gly Pro Cys Arg Ala
 325 330 335

Leu His Leu Arg Tyr Phe Tyr Asn Ala Lys Ala Gly Leu Cys Gln Thr
 340 345 350

Phe Tyr Tyr Gly Gly Cys Leu Ala Lys Arg Asn Asn Phe Glu Ser Ala
 355 360 365

Glu Asp Cys Met Arg Thr Cys Gly Gly Ala
 370 375

<210> 3
 <211> 376
 <212> PRT
 <213> Artificial

<220>
 <223> Fusion protein: human-derived ANV with synthetic human K-APP

<400> 3

Ala Gln Val Leu Arg Gly Thr Val Thr Asp Phe Pro Gly Phe Asp Glu
 1 5 10 15

Arg Ala Asp Ala Glu Thr Leu Arg Lys Ala Met Lys Gly Leu Gly Thr
 20 25 30

Asp Glu Glu Ser Ile Leu Thr Leu Leu Thr Ser Arg Ser Asn Ala Gln
 35 40 45

Arg Gln Glu Ile Ser Ala Ala Phe Lys Thr Leu Phe Gly Arg Asp Leu
 50 55 60

60020830-0003.ST25

Leu Asp Asp Leu Lys Ser Glu Leu Thr Gly Lys Phe Glu Lys Leu Ile
 65 70 75 80

Val Ala Leu Met Lys Pro Ser Arg Leu Tyr Asp Ala Tyr Glu Leu Lys
 85 90 95

His Ala Leu Lys Gly Ala Gly Thr Asn Glu Lys Val Leu Thr Glu Ile
 100 105 110

Ile Ala Ser Arg Thr Pro Glu Glu Leu Arg Ala Ile Lys Gln Val Tyr
 115 120 125

Glu Glu Glu Tyr Gly Ser Ser Leu Glu Asp Asp Val Val Gly Asp Thr
 130 135 140

Ser Gly Tyr Tyr Gln Arg Met Leu Val Val Leu Leu Gln Ala Asn Arg
 145 150 155 160

Asp Pro Asp Ala Gly Ile Asp Glu Ala Gln Val Glu Gln Asp Ala Gln
 165 170 175

Ala Leu Phe Gln Ala Gly Glu Leu Lys Trp Gly Thr Asp Glu Glu Lys
 180 185 190

Phe Ile Thr Ile Phe Gly Thr Arg Ser Val Ser His Leu Arg Lys Val
 195 200 205

Phe Asp Lys Tyr Met Thr Ile Ser Gly Phe Gln Ile Glu Glu Thr Ile
 210 215 220

Asp Arg Glu Thr Ser Gly Asn Leu Glu Gln Leu Leu Leu Ala Val Val
 225 230 235 240

Lys Ser Ile Arg Ser Ile Pro Ala Tyr Leu Ala Glu Thr Leu Tyr Tyr
 245 250 255

Ala Met Lys Gly Ala Gly Thr Asp Asp His Thr Leu Ile Arg Val Met
 260 265 270

Val Ser Arg Ser Glu Ile Asp Leu Phe Asn Ile Arg Lys Glu Phe Arg
 275 280 285

Lys Asn Phe Ala Thr Ser Leu Tyr Ser Met Ile Lys Gly Asp Thr Ser
 290 295 300

Gly Asp Tyr Lys Lys Ala Leu Leu Leu Leu Ala Gly Glu Asp Asp Glu
 305 310 315 320

60020830-0003.ST25

Val Cys Ser Glu Gln Ala Glu Thr Gly Pro Cys Arg Ala Met Ile Ser
 325 330 335

Arg Trp Tyr Phe Asp Val Thr Glu Gly Lys Cys Ala Pro Phe Phe Tyr
 340 345 350

Gly Gly Cys Gly Gly Asn Arg Asn Asn Phe Asp Thr Glu Glu Tyr Cys
 355 360 365

Met Ala Val Cys Gly Ser Ala Ile
 370 375

<210> 4

<211> 459

<212> PRT

<213> Artificial

<220>

<223> Fusion protein: human-derived ANV with KK-TFPI (a human sequence)

<400> 4

Ala Gln Val Leu Arg Gly Thr Val Thr Asp Phe Pro Gly Phe Asp Glu
 1 5 10 15

Arg Ala Asp Ala Glu Thr Leu Arg Lys Ala Met Lys Gly Leu Gly Thr
 20 25 30

Asp Glu Glu Ser Ile Leu Thr Leu Leu Thr Ser Arg Ser Asn Ala Gln
 35 40 45

Arg Gln Glu Ile Ser Ala Ala Phe Lys Thr Leu Phe Gly Arg Asp Leu
 50 55 60

Leu Asp Asp Leu Lys Ser Glu Leu Thr Gly Lys Phe Glu Lys Leu Ile
 65 70 75 80

Val Ala Leu Met Lys Pro Ser Arg Leu Tyr Asp Ala Tyr Glu Leu Lys
 85 90 95

His Ala Leu Lys Gly Ala Gly Thr Asn Glu Lys Val Leu Thr Glu Ile
 100 105 110

Ile Ala Ser Arg Thr Pro Glu Glu Leu Arg Ala Ile Lys Gln Val Tyr
 115 120 125

Glu Glu Glu Tyr Gly Ser Ser Leu Glu Asp Asp Val Val Gly Asp Thr
 130 135 140

60020830-0003.ST25

Ser Gly Tyr Tyr Gln Arg Met Leu Val Val Leu Leu Gln Ala Asn Arg
 145 150 155 160

Asp Pro Asp Ala Gly Ile Asp Glu Ala Gln Val Glu Gln Asp Ala Gln
 165 170 175

Ala Leu Phe Gln Ala Gly Glu Leu Lys Trp Gly Thr Asp Glu Glu Lys
 180 185 190

Phe Ile Thr Ile Phe Gly Thr Arg Ser Val Ser His Leu Arg Lys Val
 195 200 205

Phe Asp Lys Tyr Met Thr Ile Ser Gly Phe Gln Ile Glu Glu Thr Ile
 210 215 220

Asp Arg Glu Thr Ser Gly Asn Leu Glu Gln Leu Leu Leu Ala Val Val
 225 230 235 240

Lys Ser Ile Arg Ser Ile Pro Ala Tyr Leu Ala Glu Thr Leu Tyr Tyr
 245 250 255

Ala Met Lys Gly Ala Gly Thr Asp Asp His Thr Leu Ile Arg Val Met
 260 265 270

Val Ser Arg Ser Glu Ile Asp Leu Phe Asn Ile Arg Lys Glu Phe Arg
 275 280 285

Lys Asn Phe Ala Thr Ser Leu Tyr Ser Met Ile Lys Gly Asp Thr Ser
 290 295 300

Gly Asp Tyr Lys Lys Ala Leu Leu Leu Leu Ala Gly Glu Asp Asp Met
 305 310 315 320

His Ser Phe Cys Ala Phe Lys Ala Asp Asp Gly Pro Cys Lys Ala Ile
 325 330 335

Met Lys Arg Phe Phe Phe Asn Ile Phe Thr Arg Gln Cys Glu Glu Phe
 340 345 350

Ile Tyr Gly Gly Cys Glu Gly Asn Gln Asn Arg Phe Glu Ser Leu Glu
 355 360 365

Glu Cys Lys Lys Met Cys Thr Arg Asp Asn Ala Asn Arg Ile Ile Lys
 370 375 380

Thr Thr Leu Gln Gln Glu Lys Pro Asp Phe Cys Phe Leu Glu Glu Asp
 385 390 395 400

60020830-0003.ST25

Pro Gly Ile Cys Arg Gly Tyr Ile Thr Arg Tyr Phe Tyr Asn Asn Gln
 405 410 415

Thr Lys Gln Cys Glu Arg Phe Lys Tyr Gly Gly Cys Leu Gly Asn Met
 420 425 430

Asn Asn Phe Glu Thr Leu Glu Glu Cys Lys Asn Ile Cys Glu Asp Gly
 435 440 445

Pro Asn Gly Phe Gln Val Asp Asn Tyr Gly Thr
 450 455

<210> 5
 <211> 1380
 <212> DNA
 <213> Artificial

<220>
 <223> Fusion gene of human-derived ANV with TAP

<400> 5
 gcacaggttc tcagaggcac tgtgactgac ttccctggat ttgatgagcg ggctgatgca 60
 gaaactcttc ggaaggctat gaaaggcttg ggcacagatg aggagagcat cctgactctg 120
 ttgacatccc gaagtaatgc tcagcgccag gaaatctctg cagcttttaa gactctgttt 180
 ggcagggatc ttctggatga cctgaaatca gaactaactg gaaaatttga aaaattaatt 240
 gtggctctga tgaaaccctc tcggctttat gatgcttatg aactgaaaca tgccttgaag 300
 ggagctggaa caaatgaaaa agtactgaca gaaattattg cttcaaggac acctgaagaa 360
 ctgagagcca tcaaacaagt ttatgaagaa gaatatggct caagcctgga agatgacgtg 420
 gtgggggaca cttcagggtg ctaccagcgg atgttggttg ttctccttca ggctaacaga 480
 gaccctgatg ctggaattga tgaagctcaa gttgaacaag atgctcaggc tttatttcag 540
 gctggagaac ttaaatgggg gacagatgaa gaaaagttta tcaccatctt tggaacacga 600
 agtgtgtctc atttgagaaa ggtgtttgac aagtacatga ctatatcagg atttcaaatt 660
 gaggaaacca ttgaccgcga gacttctggc aatttagagc aactactcct tgctgtgtg 720
 aaatctattc gaagtatacc tgcctacctt gcagagaccc tctattatgc tatgaaggga 780
 gctgggacag atgatcatat cctcatcaga gtcattggtt ccaggagtga gattgatctg 840
 tttaacatca ggaaggagtt taggaagaat ttgcccacct ctctttattc catgattaag 900
 ggagatacat ctggggacta taagaaagct cttctgctgc tcgctggaga agatgacatg 960
 cattcatttt gtgcattcaa ggcggatgat ggcccatgta aagcaatcat gaaaagattt 1020
 ttcttcaata ttttactctg acagtgcgaa gaatttatat atgggggatg tgaaggaaat 1080
 cagaatcgat ttgaaagtct ggaagagtgc aaaaaaatgt gtacaagaga taatgcaaac 1140
 Page 8

60020830-0003.ST25

```

aggattataa agacaacatt gcaacaagaa aagccagatt tctgcttttt ggaagaagat 1200
cctggaatat gtcgaggtta tattaccagg tatttttata acaatcagac aaaacagtgt 1260
gaacgtttca agtatggtgg atcgctgggc aatatgaaca attttgagac actggaagaa 1320
tgcaagaaca tttgtgaaga tgggtccgaat ggtttccagg tggataatta tggaacctaa 1380

```

```

<210> 6
<211> 1137
<212> DNA
<213> Artificial

```

```

<220>
<223> Fusion gene of human-derived ANV with artificial 6L15, which is a
variant of naturally occurring bovine pancreatic trypsin inhibit
or

```

```

<400> 6
gcacaggttc tcagaggcac tgtgactgac ttccctggat ttgatgagcg ggctgatgca 60
gaaactcttc ggaaggctat gaaaggcttg ggcacagatg aggagagcat cctgactctg 120
ttgacatccc gaagtaatgc tcagcgccag gaaatctctg cagcttttaa gactctgttt 180
ggcagggatc ttctggatga cctgaaatca gaactaactg gaaaatttga aaaattaatt 240
gtggctctga tgaaaccctc tcggctttat gatgcttatg aactgaaaca tgccttgaag 300
ggagctggaa caaatgaaaa agtactgaca gaaattattg cttcaaggac acctgaagaa 360
ctgagagcca tcaaacaagt ttatgaagaa gaatatggct caagcctgga agatgacgtg 420
gtgggggaca cttcagggta ctaccagcgg atgttggtgg ttctccttca ggctaacaga 480
gaccctgatg ctggaattga tgaagctcaa gttgaacaag atgctcaggc tttatttcag 540
gctggagaac ttaaattggg gacagatgaa gaaaagttaa tcaccatctt tggaacacga 600
agtgtgtctc atttgagaaa ggtgtttgac aagtacatga ctatatcagg atttcaaatt 660
gaggaaacca ttgaccgca gacttctggc aatttagagc aactactcct tgctgttgtg 720
aaatctattc gaagtatacc tgcctacctt gcagagaccc tctattatgc tatgaaggga 780
gctgggacag atgatcatac cctcatcaga gtcatggttt ccaggagtga gattgatctg 840
tttaacatca ggaaggagt taggaagaat tttgccacct ctctttattc catgattaag 900
ggagatacat ctggggacta taagaaagct cttctgctgc tcgctggaga agatgacatg 960
catccggact tctgcctgga accgccgtac gacggtccgt gccgtgctct gcacctgcgt 1020
tacttctaca atgcaaaggc aggcctgtgt cagaccttct actacggcgg ttgcctggct 1080
aagcgtaaca acttcgaatc cgcggaagac tgcatgcgta cttgcggtgg tgcttaa 1137

```

```

<210> 7
<211> 1131
<212> DNA

```

60020830-0003.ST25

<213> Artificial

<220>

<223> Fusion gene of human-derived ANV with synthetic human K-APP gene

```

<400> 7
gcacagggttc tcagaggcac tgtgactgac ttccctggat ttgatgagcg ggctgatgca    60
gaaactcttc ggaaggctat gaaaggcttg ggcacagatg aggagagcat cctgactctg    120
ttgacatccc gaagtaatgc tcagcgccag gaaatctctg cagcttttaa gactctgttt    180
ggcagggatc ttctggatga cctgaaatca gaactaactg gaaaatttga aaaattaatt    240
gtggctctga tgaaaccctc tcggctttat gatgcttatg aactgaaaca tgccttgaag    300
ggagctggaa caaatgaaaa agtactgaca gaaattattg cttcaaggac acctgaagaa    360
ctgagagcca tcaaacaagt ttatgaagaa gaatatggct caagcctgga agatgacgtg    420
gtgggggaca cttcagggtg ctaccagcgg atgttggtgg ttctccttca ggctaacaga    480
gaccctgatg ctggaattga tgaagctcaa gttgaacaag atgctcaggc tttatttcag    540
gctggagaac ttaaatgggg gacagatgaa gaaaagttaa tcaccatctt tggaacacga    600
agtgtgtctc atttgagaaa ggtgtttgac aagtacatga ctatatcagg atttcaaatt    660
gaggaaacca ttgaccgcga gacttctggc aatttagagc aactactcct tgctgttgtg    720
aaatctattc gaagtatacc tgcctacctt gcagagaccc tctattatgc tatgaaggga    780
gctgggacag atgatcatac cctcatcaga gtcatgggtt ccaggagtga gattgatctg    840
tttaacatca ggaaggagtt taggaagaat tttgccacct ctctttattc catgattaag    900
ggagatacat ctggggacta taagaaagct cttctgctgc tcgctggaga agatgacgag    960
gtttgttctg agcaagctga gactgggtcca tgtagagcta tgatttctag atgggtacttc 1020
gacgttactg agggtaagtg tgctccattc ttctacggtg gttgtgggtg taacagaaac 1080
aacttcgaca ctgaggagta ctgtatggct gtttgtgggt ctgctattta a          1131

```

<210> 8

<211> 1380

<212> DNA

<213> Artificial

<220>

<223> Fusion gene of human-derived ANV with KK-TFPI, which is a human sequence

```

<400> 8
gcacagggttc tcagaggcac tgtgactgac ttccctggat ttgatgagcg ggctgatgca    60
gaaactcttc ggaaggctat gaaaggcttg ggcacagatg aggagagcat cctgactctg    120
ttgacatccc gaagtaatgc tcagcgccag gaaatctctg cagcttttaa gactctgttt    180
ggcagggatc ttctggatga cctgaaatca gaactaactg gaaaatttga aaaattaatt    240

```

gtggctctga	tgaaacccctc	tcggcttttat	gatgctttatg	aactgaaaca	tgcttgaag	300
ggagctggaa	caaatgaaaa	agtactgaca	gaaattattg	cttcaaggac	acctgaagaa	360
ctgagagcca	tcaaacaagt	ttatgaagaa	gaatatggct	caagcctgga	agatgacgtg	420
gtgggggaca	cttcagggtta	ctaccagcgg	atgttggttg	ttctccttca	ggctaacaga	480
gaccctgatg	ctggaattga	tgaagctcaa	gttgaacaag	atgctcaggc	tttatttcag	540
gctggagaac	ttaaattgggg	gacagatgaa	gaaaagttta	tcaccatctt	tggaacacga	600
agtgtgtctc	atttgagaaa	ggtgtttgac	aagtacatga	ctatatcagg	atttcaaatt	660
gaggaaacca	ttgaccgcga	gacttctgyc	aatttagagc	aactactcct	tgctgttgtg	720
aaatctattc	gaagtatacc	tgccctacct	gcagagaccc	tctattatgc	tatgaaggga	780
gctgggacag	atgatcatac	cctcatcaga	gtcatggttt	ccaggagtga	gattgatctg	840
tttaacatca	ggaaggagtt	taggaagaat	tttgccacct	ctctttattc	catgattaag	900
ggagatacat	ctggggacta	taagaaagct	cttctgctgc	tcgctggaga	agatgacatg	960
cattcatttt	gtgcattcaa	ggcggatgat	ggcccatgta	aagcaatcat	gaaaagattt	1020
ttcttcaata	ttttcactcg	acagtgcgaa	gaatttatat	atgggggatg	tgaaggaaat	1080
cagaatcgat	ttgaaagtct	ggaagagtgc	aaaaaaatgt	gtacaagaga	taatgcaaac	1140
aggattataa	agacaacatt	gcaacaagaa	aagccagatt	tctgcttttt	ggaagaagat	1200
cctggaatat	gtcgaggtta	tattaccagg	tattttttata	acaatcagac	aaaacagtgt	1260
gaacgtttca	agtatggtgg	atcgctgggc	aatatgaaca	attttgagac	actggaagaa	1320
tgcaagaaca	tttgtgaaga	tggtccgaat	ggtttccagg	tggataatta	tggaacctaa	1380

<400>	9								
gcacagggttc	tcagaggcac	tgtgactgac	ttccctggat	ttgatgagcg	ggctgatgca				60
gaaactcttc	ggaaggctat	gaaaggcttg	ggcacagatg	aggagagcat	cctgactctg				120
ttgacatccc	gaagtaatgc	tcagcgcag	gaaatctctg	cagctttaa	gactctgttt				180
ggcagggatc	ttctggatga	cctgaaatca	gaactaactg	gaaaatttga	aaaattaatt				240
gtggctctga	tgaaaccctc	tcggctttat	gatgcttatg	aactgaaaca	tgacctgaag				300
ggagctggaa	caaataaaaa	agtactgaca	gaaattattg	cttcaaggac	acctgaagaa				360
ctgagagcca	tcaaacaagt	ttatgaagaa	gaatatggct	caagcctgga	agatgacgtg				420
gtgggggaca	cttcagggtta	ctaccagcgg	atgttggttg	ttctccttca	ggctaacaga				480
gaccctgatg	ctggaattga	tgaagctcaa	gttgaaacaag	atgctcaggc	tttatttcag				540

60020830-0003.ST25

gctggagaac ttaaattgggg gacagatgaa gaaaagttaa tcaccatctt tggaacacga 600
 agtgtgtctc atttgagaaa ggtgtttgac aagtacatga ctatatcagg atttcaaatt 660
 gaggaaccca ttgaccgcga gacttctggc aatttagagc aactactcct tgctgttgtg 720
 aaatctattc gaagtatacc tgcctacctt gcagagaccc tctattatgc tatgaaggga 780
 gctgggacag atgatcatat cctcatcaga gtcatgggtt ccaggagtga gattgatctg 840
 tttaacatca ggaaggagtt taggaagaat ttgcccacct ctctttattc catgattaag 900
 ggagatacat ctggggacta taagaaagct cttctgctgc tctgtggaga agatgactaa 960

<210> 10
 <211> 319
 <212> PRT
 <213> Homo sapiens

<400> 10

Ala Gln Val Leu Arg Gly Thr Val Thr Asp Phe Pro Gly Phe Asp Glu
 1 5 10 15

Arg Ala Asp Ala Glu Thr Leu Arg Lys Ala Met Lys Gly Leu Gly Thr
 20 25 30

Asp Glu Glu Ser Ile Leu Thr Leu Thr Ser Arg Ser Asn Ala Gln
 35 40 45

Arg Gln Glu Ile Ser Ala Ala Phe Lys Thr Leu Phe Gly Arg Asp Leu
 50 55 60

Leu Asp Asp Leu Lys Ser Glu Leu Thr Gly Lys Phe Glu Lys Leu Ile
 65 70 75 80

Val Ala Leu Met Lys Pro Ser Arg Leu Tyr Asp Ala Tyr Glu Leu Lys
 85 90 95

His Ala Leu Lys Gly Ala Gly Thr Asn Glu Lys Val Leu Thr Glu Ile
 100 105 110

Ile Ala Ser Arg Thr Pro Glu Glu Leu Arg Ala Ile Lys Gln Val Tyr
 115 120 125

Glu Glu Glu Tyr Gly Ser Ser Leu Glu Asp Asp Val Val Gly Asp Thr
 130 135 140

Ser Gly Tyr Tyr Gln Arg Met Leu Val Val Leu Leu Gln Ala Asn Arg
 145 150 155 160

60020830-0003.ST25

Asp Pro Asp Ala Gly Ile Asp Glu Ala Gln Val Glu Gln Asp Ala Gln
 165 170 175

Ala Leu Phe Gln Ala Gly Glu Leu Lys Trp Gly Thr Asp Glu Glu Lys
 180 185 190

Phe Ile Thr Ile Phe Gly Thr Arg Ser Val Ser His Leu Arg Lys Val
 195 200 205

Phe Asp Lys Tyr Met Thr Ile Ser Gly Phe Gln Ile Glu Glu Thr Ile
 210 215 220

Asp Arg Glu Thr Ser Gly Asn Leu Glu Gln Leu Leu Leu Ala Val Val
 225 230 235 240

Lys Ser Ile Arg Ser Ile Pro Ala Tyr Leu Ala Glu Thr Leu Tyr Tyr
 245 250 255

Ala Met Lys Gly Ala Gly Thr Asp Asp His Thr Leu Ile Arg Val Met
 260 265 270

Val Ser Arg Ser Glu Ile Asp Leu Phe Asn Ile Arg Lys Glu Phe Arg
 275 280 285

Lys Asn Phe Ala Thr Ser Leu Tyr Ser Met Ile Lys Gly Asp Thr Ser
 290 295 300

Gly Asp Tyr Lys Lys Ala Leu Leu Leu Leu Cys Gly Glu Asp Asp
 305 310 315

<210> 11
 <211> 33
 <212> DNA
 <213> Artificial

<220>
 <223> ANV reverse primer

<400> 11
 atcaagctta tgcattgtcat cttctccaca gag

33

<210> 12
 <211> 31
 <212> DNA
 <213> Artificial

<220>
 <223> ANV forward primer

<400> 12
 gatcggatcc agtctgggtcc tgcttcacct t

31

60020830-0003.ST25

<210> 13
 <211> 32
 <212> DNA
 <213> Artificial

<220>
 <223> Synthetic oligonucleotide used to generate ANV cDNA mutation of Cys-to-Ala at position 315

<400> 13
 cgtgacatgc atgtcatctt ctccagcgag ca 32

<210> 14
 <211> 960
 <212> DNA
 <213> Artificial

<220>
 <223> Sequence encoding human ANV with Cys-to-Ala mutation at position 315

<400> 14
 gcacagggttc tcagaggcac tgtgactgac ttccctggat ttgatgagcg ggctgatgca 60
 gaaactcttc ggaaggctat gaaaggcttg ggcacagatg aggagagcat cctgactctg 120
 ttgacatccc gaagtaatgc tcagcgccag gaaatctctg cagcttttaa gactctgttt 180
 ggcagggatc ttctggatga cctgaaatca gaactaactg gaaaatttga aaaattaatt 240
 gtggctctga tgaaacctc tcggctttat gatgcttatg aactgaaaca tgccttgaag 300
 ggagctggaa caaatgaaaa agtactgaca gaaattattg cttcaaggac acctgaagaa 360
 ctgagagcca tcaacaagt ttatgaagaa gaatatggct caagcctgga agatgacgtg 420
 gtgggggaca cttcagggtg ctaccagcgg atgttggtgg ttctccttca ggctaacaga 480
 gaccctgatg ctggaattga tgaagctcaa gttgaacaag atgctcaggc tttatttcag 540
 gctggagaac ttaaatggg gacagatgaa gaaaagtta tcaccatctt tggaacacga 600
 agtgtgtctc atttgagaaa ggtgtttgac aagtacatga ctatatcagg atttcaaatt 660
 gaggaaacca ttgaccgca gacttctggc aatttagagc aactactcct tgctgttgtg 720
 aaatctattc gaagtatacc tgccctacct gcagagacct tctattatgc tatgaaggga 780
 gctgggacag atgatcatc cctcatcaga gtcattggtt ccaggagtga gattgatctg 840
 tttaacatca ggaaggagtt taggaagaat ttgcccact ctctttattc catgattaag 900
 ggagatacat ctggggacta taagaaagct cttctgctgc tcgctggaga agatgactaa 960

<210> 15
 <211> 64
 <212> DNA
 <213> Artificial

<220>

60020830-0003.ST25

<223> Synthetic oligonucleotide, first of three forward primers used to generate recombinant 6L15 gene

<400> 15
 tccggacttc tgcttgaac cgccgtacga cgggccgtgc cgtgctctgc acctgcgtta 60
 cttc 64

<210> 16
 <211> 60
 <212> DNA
 <213> Artificial

<220>
 <223> Synthetic oligonucleotide, second of three forward primers used to generate recombinant 6L15

<400> 16
 tacaatgcaa aggcaggcct gtgtcagacc ttctactacg gcggttgcct ggctaagcgt 60

<210> 17
 <211> 50
 <212> DNA
 <213> Artificial

<220>
 <223> Synthetic oligonucleotide, third of three forward primers used to generate recombinant 6L15 gene

<400> 17
 aacaacttcg aatccgcgga acactgcatg cgtacttgcg gtggtgctta 50

<210> 18
 <211> 63
 <212> DNA
 <213> Artificial

<220>
 <223> Synthetic oligonucleotide, first of three reverse primers used to generate recombinant 6L15 gene

<400> 18
 acgcagggtgc agagcacggc acggaccgtc gtacggcggt tccaggcaga agtccggatg 60
 cat 63

<210> 19
 <211> 60
 <212> DNA
 <213> Artificial

<220>
 <223> Synthetic oligonucleotide, second of three reverse primers used to generate recombinant 6L15 gene

<400> 19
 agccaggcaa ccgccgtagt agaaggctc acacaggcct gcctttgcat tgtagaagta 60

60020830-0003.ST25

<210> 20
 <211> 60
 <212> DNA
 <213> Artificial

<220>
 <223> Synthetic oligonucleotide, third of three reverse primers used to generate recombinant 6L15 gene

<400> 20
 agcttaagca ccaccgcaag tacgcatgca gtcttccgcg gattcgaagt tggtacgctt 60

<210> 21
 <211> 177
 <212> DNA
 <213> Artificial

<220>
 <223> synthetic 6L15 gene

<400> 21
 gctccggact tctgcctgga accgccgtac gacgggtccgt gccgtgctct gcacctgcgt 60
 tactttctaca atgcaaaggc aggcctgtgt cagaccttct actacggcggt ttgcctggct 120
 aagcgtaaca acttcgaatc cgcggaagac tgcattgcgt cttgcgggtg tgcttaa 177

<210> 22
 <211> 186
 <212> DNA
 <213> Artificial

<220>
 <223> Synthetic, derived from Ornithodoros moubata gene

<400> 22
 gcttacaacc gtctgtgcat caaaccgcgt gactggatcg acgaatgcga ctccaacgaa 60
 ggtggtgaac gtgcttactt ccgtaacggt aaaggtgggt gcgactcctt ctggatctgc 120
 ccggaagacc acaccggtgc tgactactac tcctcctacc gtgactgctt caacgcttgc 180
 atctaa 186

<210> 23
 <211> 122
 <212> DNA
 <213> Artificial

<220>
 <223> forward synthetic oligonucleotide for generating synthetic K-APP gene with flanking sequences

<400> 23
 ggccctaccc cacagatacg gagttgccac cactgaaact tgaggttggt agagaggttt 60
 gttctgagca agctgagact ggtccatgta gagctatgat ttctagatgg tacttcgacg 120
 tt 122

60020830-0003.ST25

<210> 24
 <211> 117
 <212> DNA
 <213> Artificial

<220>
 <223> forward synthetic oligonucleotide for generating synthetic K-APP gene with flanking sequences

<400> 24
 actgagggtta agtgtgctcc attcttctac ggtggttggtg gtggtaacag aaacaacttc 60
 gacactgagg agtactgtat ggctgtttgt ggttctgcta tttaaagca ttgatga 117

<210> 25
 <211> 124
 <212> DNA
 <213> Artificial

<220>
 <223> reverse synthetic oligonucleotide for generating synthetic K-APP gene with flanking sequences

<400> 25
 ctcaagtaacg tcgaagtacc atctagaaat catagctcta catggaccag tctcagcttg 60
 ctcaagaaca acctctctaa caacctcaag tttcagtggt ggcaactccg tatctgtggg 120
 gtag 124

<210> 26
 <211> 115
 <212> DNA
 <213> Artificial

<220>
 <223> reverse synthetic oligonucleotide for generating synthetic K-APP gene with flanking sequences

<400> 26
 agcttcatca atgcatttaa atagcagaac cacaacacgc catacagtac tcctcagtggt 60
 cgaagttggt tctgtttacca ccacaaccac cgtagaagaa tggagcacac ttacc 115

<210> 27
 <211> 174
 <212> DNA
 <213> Artificial

<220>
 <223> synthetic K-APP gene, derived from human sequence

<400> 27
 gaggtttggt ctgagcaagc tgagactggt ccatgtagag ctatgatttc tagatggtac 60
 ttcgacgtta ctgagggtaa gtgtgctcca ttcttctacg gtggttggtg tggtaacaga 120
 aacaacttcg aactgagga gtactgtatg gctgtttgtg gttctgctat ttaa 174

60020830-0003.ST25

<210> 28
 <211> 30
 <212> DNA
 <213> Artificial

<220>
 <223> primer

<400> 28
 ggaattccat atggcacagg ttctcagagg

30

<210> 29
 <211> 24
 <212> DNA
 <213> Artificial

<220>
 <223> primer

<400> 29
 ccaatgcatg tcattttctc cagc

24

<210> 30
 <211> 24
 <212> DNA
 <213> Artificial

<220>
 <223> primer

<400> 30
 ccaatgcatc cggacttctg cctg

24

<210> 31
 <211> 24
 <212> DNA
 <213> Artificial

<220>
 <223> primer

<400> 31
 ccaatgcatt cattttgtgc attc

24

<210> 32
 <211> 27
 <212> DNA
 <213> Artificial

<220>
 <223> primer

<400> 32
 acgcgtcgac ttaagcacca ccgcaag

27

<210> 33
 <211> 29

60020830-0003.ST25

<212> DNA
<213> Artificial

<220>
<223> primer

<400> 33
acgcgtcgac ttaggtcca taattatcc 29

<210> 34
<211> 30
<212> DNA
<213> Artificial

<220>
<223> primer

<400> 34
ggaattccat atggcttaca accgtctgtg 30

<210> 35
<211> 27
<212> DNA
<213> Artificial

<220>
<223> primer

<400> 35
cgggatccga tgcaagcgtt-gaagcag 27

<210> 36
<211> 26
<212> DNA
<213> Artificial

<220>
<223> primer

<400> 36
cgggatccgc acaggttctc agaggc 26

<210> 37
<211> 29
<212> DNA
<213> Artificial

<220>
<223> primer

<400> 37
acgcgtcgac ttagtcatct tctccagcg 29

<210> 38
<211> 31
<212> DNA
<213> Artificial

60020830-0003.ST25

<220>
<223> primer designed for generating PCR fragment of interest for cloning into vector pPIC9

<400> 38
ccgctcgaga aaagagcaca ggttctcaga g 31

<210> 39
<211> 33
<212> DNA
<213> Artificial

<220>
<223> primer designed for generating PCR fragment of interest for cloning into yeast expression vector pPIC9

<400> 39
ataagaatgc ggccgcttaa atagcagaac cac 33

<210> 40
<211> 24
<212> DNA
<213> Artificial

<220>
<223> primer designed for generating PCR fragment of interest for cloning into yeast expression vector pPIC9

<400> 40
cgcgatatca tcttctccag cgag 24

<210> 41
<211> 20
<212> DNA
<213> Artificial

<220>
<223> primer designed for generating PCR fragments of interest for cloning into yeast expression vector pPIC9

<400> 41
gaggtttggt ctgagcaagc_ 20